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Notes on the *Aloeides penningtoni* complex from South Africa (Lepidoptera: Lycaenidae) with descriptions of three new species

by

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The *Aloeides penningtoni* Tite and Dickson complex is revised and *Aloeides natalensis* Tite and Dickson is synonymized with *Aloeides penningtoni*. Three new species are described, *Aloeides titei, Aloeides dicksoni* and *Aloeides caffrariae*. Notes on known habits and distribution are provided.

INTRODUCTION

Tite and Dickson (1968), in their revision of the genus *Aloeides* Hübner described *Aloeides penningtoni* and *Aloeides natalensis* from Natal. The type locality for *A. penningtoni* is Gillitts, Durban, and for *A. natalensis* is Muden. The paratypes, however, show a wide geographical distribution for *A. penningtoni* whereas *A. natalensis* is confined to the midlands of Natal.

The paratype series for *A. penningtoni* was collected from Natal: Durban, Umkomaas, Estcourt, Enseleni and Franklin; the Transvaal: Kastrol Nek; and the Eastern Cape: Glenconnor, Grahamstown and Transkei.

The paratype series of *A. natalensis* comes from Natal: Rosetta, Balgowan, Yellowwoods, Durban, Dargle, Newcastle, Karkloof, Ulundi, Pinetown and Vryheid.

Tite and Dickson comment in the description of *A. natalensis* that 'it is with some hesitation that this insect is described as a species.' The main difference between *A. penningtoni* and *A. natalensis* as defined by Tite and Dickson is the narrowing of the marginal border towards the tornus on the fore wing upper side in *A. penningtoni*; this border is of even width in *A. natalensis*.

Since Tite and Dickson completed their work, more specimens have become available for study and additional localities have been discovered. It has been found from this material that the narrowing of the fore wing border is an extremely unreliable diagnostic character. It appears that the extent of these black markings can be affected by climatic conditions, but this feature is unstable and dark specimens can be found together with lighter ones and a variety of intermediate specimens.

As the main diagnostic feature separating *A. penningtoni* and *A. natalensis* is no longer considered valid, a reassessment of the two species based on new characters must be made. The species in the *A. thyra* complex all appear to be ant-associated and colonial, with individual colonies often completely isolated. These colonies often draw on a limited gene pool and have developed their own characteristics, usually with regard to the ground colour and extent of the dark markings. However, the hind wing under side markings have proved to be the most reliable diagnostic character that remains constant within a species. This can be used to link these apparently different populations. Other characters which have proved to be diagnostic in some species are the proportions and scaling of the palpi.

By using the diagnostic characters available members of the *Aloeides pennington*i complex can be identified as follows:

Key to the *A. dryas* group (includes *A. penningtoni* complex).

1 Fore wing without triangular apical patch, cilia unmarked .... *A. dryas* Tite & Dickson
— Fore wing with triangular apical patch, cilia marked 2
2 Under side hind wing with small clearly defined spots .... *titei* sp. nov.
— Under side markings not clearly defined 3
3 Under side ground colour very pale, regular markings with distal edge to the medial markings distinctly blackened .... *dicksoni* sp. nov.
— Under side dark red or reddish brown, irregular silvery markings without distinctly blackened distal edges 4
4 Antennae grey, fore wing average length 13 mm, pale tawny orange and distal segment of palpi more than half the length of the second segment .... *caffrariae* sp. nov.
— Antennae black, fore wing average length 15 mm, tawny orange and distal segment of palpi less than half the length of the second segment .... *penningtoni* (= *natalensis* syn. nov.)

Aloeides penningtoni Tite and Dickson, Figs 1–2, 9–10, 17.

Aloeides penningtoni Tite and Dickson, 1968: 380.
Aloeides natalensis Tite and Dickson, 1968: 380, **syn. nov.**

A. penningtoni was described first in the same publication and on the same page as *A. natalensis*.

The type locality of *A. penningtoni* in Durban apparently no longer exists but specimens examined from Shongweni Dam, Stoney Hill and Pennington display such variability in the width of the fore wing border that this cannot be regarded as a distinguishing character between *A. penningtoni* and *A. natalensis*. Collections from the Kokstad district (one paratype of *A. penningtoni* from this district is from Franklin) show a predominance of *A. penningtoni* but with typical *A. natalensis* present, and some intermediates. Specimens from the Natal Midlands and the Drakensberg are predominantly *A. natalensis* with some typical *A. penningtoni* and intermediates. The hind wing under side markings (which are the main diagnostic feature of the *Aloeides thyra group*) are the same for *A. penningtoni* and *A. natalensis*. Therefore it seems necessary from the examination of almost three hundred specimens to make *A. natalensis* synonymous with *A. penningtoni*.

A brief description of the hind wing under side of *A. penningtoni* is as follows: ground colour red to dark reddish brown with a diffuse patch of silvery scales from the centre of the anal fold to midway towards the apex; some diffuse brown scaling is present along the distal edge; a submarginal patch of silvery scales is present midway along the margin. In some related species of *Aloeides* two distinct ground colour variants are evident, one being red and the other brown with almost no intermediate shades. None of the specimens of *A. penningtoni* studied showed this latter character.

Some specimens in the paratype series of *A. penningtoni* are considered to be new species on the basis of the hind wing under side markings and palpi. These are described later in this paper.

The revised paratype series of *A. penningtoni* is as follows: Natal: 3 ♂, 1 ♀, Durban (Trimen Coll.); 1 ♂, Port Natal (Felder Coll.); 1 ♂, Umkomaas, 19.i.1913; 1 ♂, Estcourt, 26.x.1890; 1 ♂ Enselini, Zululand; 1 ♂, Franklin, 3.i.1938, K. M. Pennington; 2 ♂ Transkei, Miss Barrett.

Aloeides titei sp. nov., Figs 3–4, 11–12, 18.

Aloeides penningtoni Tite and Dickson, 1968 (in part).

Investigations of paratype localities of *A. penningtoni* led to numerous specimens being studied from colonies near Wakkerstroom (Kastrol Nek) in the south-eastern Transvaal. It was found that the fore wing border was extremely variable, most specimens being more like '*A. natalensis*'. The hind wing under side however was found to be consistently different from *A. penningtoni*. This population, while being represented in the paratype series of *A. penningtoni*, is considered to be a new species.

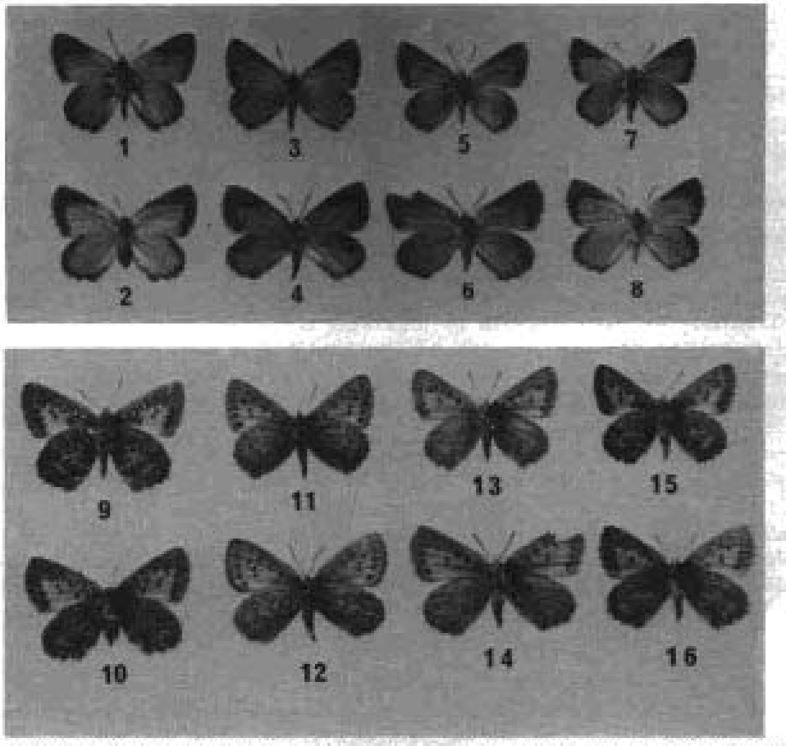
MALE. Wing shape more elongated than *A. penningtoni*. Under side ground colour mid-brown or pinkish-red. All *A. penningtoni* studied were deep red to reddish-brown. Hind wing under side markings consist of small clearly defined silvery marks distally edged with black. In *A. penningtoni* these markings consist of a diffuse silvery patch without prominent black edging. Palpi (Fig. 18) similar to *A. penningtoni* but without clearly defined whitish patches and ribbon-like scales longer and more prolific.

FEMALE. Differs from *A. penningtoni* in the same way as does the male.

MALE HOLOTYPE. Fore wing length 14,0 mm: Antennae black. *Palpi* heavily covered with scales, those on distal and second segment coppery-brown without white patches; long coppery-brown ribbon-like scales on the second segment with distal segment short, less than half the length of second segment. *Wings: upper side*. Fore wing tawny-orange with black marginal border and apical patch. Cilia grey, becoming black at ends of veins. Hind wing tawny-orange with large black apical patch and a continous narrow sinuate marginal band; anal fold ochreous. Cilia black, becoming greyish interneurally. *Under side*. Fore wing tawny-orange, bordered by a continuous brown costal and distal marginal band with black spots as normal in *Aloeides*. Cilia mainly black, becoming slightly greyer interneurally. Hind wing brown with a bold pattern of black and silvery-white markings. Discoidal fascia two separate marks, irregular sinuate median series broken up into distinct separate v-shaped marks and a series of submarginal lunules. Median and submarginal series proximally silvery-grey and distally broadly edged with black. Cilia brown.

MALE PARATYPES. Fore wing lengths 11,5–15,5 mm. *Wings: upper side*. Several paratypes differ from the holotype in having the fore wing marginal border of variable width, apical patches of both fore & hind wings variable. *Under side*. Pattern similar to holotype but some specimens have pinkish-red areas on both fore and hind wings.

FEMALE PARATYPES. Fore wing lengths 13,0–16,5 mm. *Palpi* with first and second segments coppery-brown with ribbon-like scales. *Wings*. More rounded than male, otherwise similar. Cilia dark grey.



Figs 1–16 *A. penningtoni* complex. 1–8. Upper side. 1. *A. penningtoni* ♂. 2. *A. penningtoni* ♀. 3 *A. tilei* **sp. nov.** ♂ holotype. 4. *A. tilei* ♀ paratype. 5. *A. dicksoni* **sp. nov.** ♂ holotype. 6. *A. dicksoni* ♀ paratype. 7. *A. caffrariae* **sp. nov.** ♂ holotype. 8. *A. caffrariae.* ♀ paratype. 9–16. Under side. 9. *A. penningtoni* ♂. 10. *A. penningtoni* ♀. 11. *A. tilei* ♂ holotype. 12. *A tilei* ♀ paratype. 13. *A. dicksoni* ♂ holotype. 14. *A. dicksoni* ♀ paratype. 15. *A. caffrariae* ♂ holotype. 16. *A. caffrariae* ♀ paratype.

MATERIAL EXAMINED. SOUTH AFRICA: Holotype ♂, Kastrol Nek, Transvaal, 21.xii.1968, D. M. Kroon. Paratypes 12 ♂, 3 ♀, same data as holotype; 3 ♂, 1 ♀, as holotype but 24.xii.1967; 1 ♂, 1 ♀, as holotype but 7.i.1968; 1 ♂, as holotype but 8.i.1968; 13 ♂, 8 ♀, Wakkerstroom, 29.i.1983, G. A. Henning; 1 ♂, 2 ♀, Wakkerstroom, 14.ii.1982, G. A. Henning; 1 ♂, 1 ♀, Wakkerstroom, 11.ii.1984, G. A. Henning, 15 ♂, 8 ♀, as holotype but 18.i.1983, 31.i.1983. 6.ii.1982, 11.xi.1984, N. K. Owen-Johnston. The holotype is deposited in the Transvaal Museum, Pretoria. Paratypes in the collections of W. H., S. F. & G. A. Henning, D. M. Kroon, N. K. Owen-Johnston and Transvaal Museum.

DISTRIBUTION AND HABITS. This species occurs in sporadic colonies on the slopes below the highest peaks of the mountains near Wakkerstroom, Transvaal. It flies around bare rocky areas particularly where erosion has occurred. It sits on the ground or on rocks, and circles around swiftly when disturbed. It does not exhibit hilltopping behaviour. This species is named after Mr G. E. Tite, whose work (with that of Mr C. G. C. Dickson) represents the basis for the study of *Aloeides*.

Aloeides dicksoni sp. nov., Figs 5–6, 13–14, 19.

A number of specimens from the mountains of the eastern Cape were also studied and the hind wing under sides of the populations from Cradock and Elandsberg are distinctive.

MALE. Wing shape more acuminate than *A. penningtoni*. Antennae reddish-brown to greyish-brown unlike *A. penningtoni* which has charcoal-black antennae. Upper side similar to *A. penningtoni* but with ground colour slightly paler. The hind wing under side is pale brown or pale pink with indistinct regular silvery markings edged with blackish-brown distally. Palpi (Fig. 19) white to pale greyish-brown, distal segment shorter in proportion to second segment than in *A. penningtoni*.

FEMALE. Differs from *A. penningtoni* in the same way as the male.

MALE HOLOTYPE. Fore wing length 13,5 mm: Antennae reddish-brown to greyish-brown. *Palpi* heavily covered with rather broad scales, those on second segment pale greyish-brown with large white patches. Ribbon-like scales short and very sparse. Distal segment short and broad being slightly over one third the length of the second segment. *Wings, upper side*. Fore wing tawny-orange with black marginal border and apical patch. Cilia grey, becoming black at ends of veins. Hind wing tawny-orange with irregular black apical patch and a continuous narrow sinuate marginal band; anal fold orange. Cilia grey, becoming blackish at ends of veins. *Under side*. Fore wing tawny-orange, margined by a continuous pale brown costal and distal marginal border, normal black spots. Cilia mainly grey, becoming brown at the ends of veins. Hind wing pale brown with indistinct pattern of black and silvery-white markings. Discoidal fascia broken up into two marks, regular sinuate median series, and a series of submarginal lunules. Median and submarginal series proximally silvery-grey and distally distinctly blackish-brown. Cilia grey with dark brown at the ends of the veins.

MALE PARATYPES. Fore wing lengths 13,5–15,0 mm. *Wings, upper side*. Several paratypes differ from the holotype in having the marginal borders of the fore wings of slightly variable widths. Apical patches of both the fore and hind wings also slightly variable. *Under side*.- Pattern similar to holotype but some specimens have the pale brown areas of both fore and hind wings pale pink. Hind wing markings more extensive and distinct on some specimens.

FEMALE PARATYPES. Fore wing lengths 7,0 mm. *Palpi* with distal and second segments greyish-brown and the third reddish brown. *Wings*: More rounded than male, otherwise similar. Cilia dark grey.

MATERIAL EXAMINED. SOUTH AFRICA: Holotype ♂, Cradock, Cape Province, 17.xi.1983, E. L. Pringle. Paratypes: 4 ♂, as holotype, 1 ♀, as holotype but V. L. Pringle; 4 ♂, as holotype but 7.xii.1978; 1 ♀, as holotype but 7.xii.1976. Other specimens examined: Elandsberg, 23.xii.1976; 1 ♂, 1 ♀, D. M. Kroon, 1 ♀, R. D. Stephen.

The holotype is deposited in the Transvaal Museum, Pretoria, paratypes in the collections of W. H., S. F. and G. A. Henning, V. L. and E. L. Pringle and Transvaal Museum.

DISTRIBUTION AND HABITS. Occurs on the mountains around Cradock, eastern Cape Province. Specimens agreeing with this species have also been recorded from Elandsberg near Stutterheim. It exhibits the usual *Aloeides* habits.

This species is named in honour of Mr. C. G. C. Dickson of Cape Town whose assistance and encouragement have been of immeasurable help to me. His work with Mr Tite on the *Aloeides* is the basis for further research on the genus.

Aloeides caffrariae. sp. nov., Figs 7–8, 15–16, 20.

Aloeides penningtoni Tite & Dickson, 1968 (in part).

Specimens from the coastal area of the Eastern Cape do not exhibit the distinctive hind wing under sides of the inland examples and agree with the hind wing under sides of *A. penningtoni.* Because of this it was originally thought that *A. caffrariae* could represent a southern subspecies of *A. penningtoni* but other characters have led me to consider this population to be a distinct species.

MALE. Smaller in size than *A. penningtoni.* Average fore wing length 13 mm, *A. penningtoni* is 15 mm which is 15% larger, the wing shape is also more elongate than normal *A. penningtoni.* Antennae silver to grey whereas in *A. penningtoni* they are charcoal black. Ground colour of upper side pale tawny-orange while that of *A. penningtoni* is bright tawny-orange. Cilia usually distinctly marked, *A. penningtoni* has indistinctly marked cilia. Under side similar to *A. penningtoni* but with ground colour paler. Palpi (Fig. 20) distal segment more than half the length of second segment, *A. penningtoni* has the distal segment less than half.

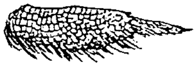
FEMALE. Similar to male and differs from *A. penningtoni* by the same characters.

MALE HOLOTYPE. Fore wing length 13,0 mm: Antennae grey. *Palpi* heavily covered with rather broad scales, those on second segment dark brown with white patches and long white ribbon-like scales. Distal segment long and narrow and more than half the length of the second segment. *Wings: upper side.* Fore wing pale tawny-orange with black marginal border and apical patch. Cilia greyish-white, black at ends of veins. Hind wing pale tawny-orange with irregular black apical patch and a continuous narrow sinuate marginal band; anal fold pale grey. Cilia grey, becoming black at ends of veins. *Under side.* Fore wing pale tawny-orange, margined by a continuous deep red costal and distal marginal band, usual black spots. Cilia mainly black becoming greyish-white interneurally. There are distinct silvery-white marginal dots at the ends of the veins. Hind wing deep red with a bold pattern of black and silvery-white markings. Discoidal fascia confluent, very irregular sinuate median series and a series of submarginal marks forming a patch. Cilia brown with greyish-white interneurally.

MALE PARATYPES. Fore wing lengths 12,0–14,5 mm. *Wings, upper side.* Several paratypes differ from the holotype in having indistinct orange subapical spots. marginal border of the fore wing slightly wider, apical patches of both the fore and hind wings slightly larger. *Under side.* Pattern similar to holotype but some specimens have the crimson-red area of both fore and hind wings pinkish-brown.

Female Paratypes. Fore wing lengths 13,5–15,0 mm. *Palpi* with first and second segments greyish-white, and the third reddish-brown. *Wings:* more rounded than male otherwise similar. Cilia dark grey.

Material Examined. SOUTH AFRICA: Holotype ♂, Quinera River, East London, Cape, 25.x.1981, N. J. Duke. Paratypes: 1 ♂ same data as holotype; 1 ♂, 3 ♀, Buffalo Pass, East London, 18.xi.1979, N. J. Duke; 3 ♂, as holotype but 9.ii.1980, 8.xi.1980, 25.x.1981; 1 ♀, Buffalo Pass, E.L., 11.xi.82, N. J. Duke; 5 ♂, 1 ♀, East London, 3.iii.1977, P. S. Liversidge; 4 ♂, Cintsa East, 24–31.xii.1984, P. Steyn; 7 ♂, Beacon Bay, E.L., 4.xii.1984, 9.iii.1985 & 11.iii.1985, A. J. Duke. Other specimens examined 1 ♂, 1 ♀, Boknes, E.-C.P., 29.xii.1981, D. Whitely; 1 ♂, Grahamstown, 19.x.1967, B. Barton-Eckett. The holotype is deposited in the Transvaal Museum, Pretoria; paratypes in the collections of W. H., S. F. & G. A. Henning, R. D. Stephen, P. S. Liversidge, A. J. Duke, P. Steyn, D. Whitely and Transvaal Museum.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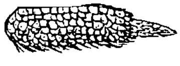
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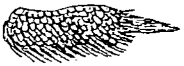
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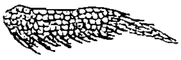
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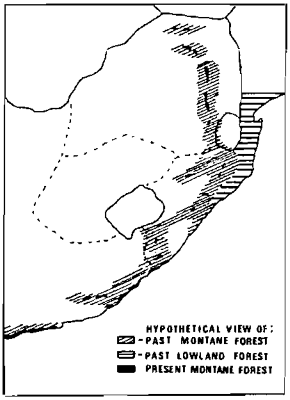

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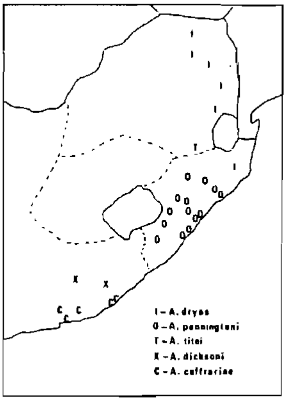

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Figs 17–22 *A. penningtoni* complex. 17–20. Male palpi. 17. *A. penningtoni* 18. *A. titei* sp. nov. 19. *A. dicksoni* sp. nov. 20. *A. caffrariae* sp. nov. 21. Palaeoecological conditions causing possible development of the species in the *A. dryas* Group. 22. Distribution of *A. dryas* Group.

DISTRIBUTION AND HABITS. Occurs along the Eastern Cape coast from Cintsa East to Boknes. It has been recorded from almost on the beach at Boknes to as far inland as Grahamstown. It exhibits the usual *Aloeides* habits.

PALAEOECOLOGICAL DISCUSSION: From an examination of current ecological conditions with regard to the possible palaeoecological isolation and development of the *A. dryas* group it appears probable that montane forest conditions have largely contributed to the isolation of these specific populations.

The altitude and extent of montane forest is largely dependent on temperature fluctuations. The lower the temperature the lower the altitude of the montane forest and the more extensive it becomes creating effective ecological barriers for colonial grassland species such as *Aloeides*. Taking the current relict montane forest as an indication, Fig. 21 shows the possible palaeoecological conditions which could have contributed to the independent development of the species in the *A. dryas* group. The current distribution of the *A. dryas* group is shown in Fig. 22.

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